

WHAT IS CLAIMED IS:

1. An oscillation apparatus comprising:
a multi-mode dielectric resonant element;
a plurality of oscillation circuits, each oscillation circuit including a line
coupled to the dielectric resonant element and active devices connected to ends of the
5 line; and
a substrate having the lines and the active devices provided thereon, the
dielectric resonant element being placed on the substrate,
wherein magnetic fields, occurring in the dielectric resonant element, in
a plurality of resonant modes having different resonant frequencies are coupled to the
10 corresponding lines in the plurality of oscillation circuits.
2. An oscillation apparatus according to Claim 1,
wherein the plurality of oscillation circuits is two oscillation circuits,
wherein a line of one oscillation circuit is placed substantially in
parallel to a line of the other oscillation circuit,
5 wherein the multi-mode dielectric resonant element is placed between
said line of one oscillation circuit and said line of the other oscillation circuit, and
wherein magnetic fields in two resonant modes of the dielectric
resonant element are coupled to the corresponding lines.
3. An oscillation apparatus according to Claim 2, wherein the two
resonant modes are a TM_{01δ} mode and a TE_{01δ} mode.
4. An oscillation apparatus according to Claim 1, wherein the dielectric
resonant element is a substantially circular dielectric plate.
5. An oscillation apparatus according to Claim 1, wherein the dielectric
resonant element is a substantially square dielectric plate.
6. An oscillation apparatus according to claim 1, wherein the dielectric
element includes at least one cut-out area.

7. An oscillation apparatus according to claim 6, wherein there are two cut-out areas provided symmetrically relative to a plane through the dielectric element.
8. An oscillation apparatus according to claim 7, wherein the cut-out areas are holes in the dielectric element.
9. An oscillation apparatus according to claim 6, wherein the at least one cut-out area is provided along a plane through the dielectric element.
10. An oscillation apparatus according to claim 1, wherein the dielectric element includes a support for supporting the dielectric element at a predetermined height from the substrate.
11. An oscillation apparatus according to claim 5, wherein two sides of the square dielectric plate are parallel to the lines.
12. An oscillation apparatus according to claim 5, wherein sides of the square dielectric plate are at an angle with respect to the lines.
13. An oscillation apparatus according to claim 12, wherein the angle is 45 degrees.
14. A communication apparatus comprising the oscillation apparatus according to Claim 1.